United States Department of Agriculture

Natural Resources Conservation Service

Lakewood, Colorado

RWA 10260002

December 2008

North Fork Smoky Hill Watershed

Hydrologic Unit Code 10260002

Rapid Assessment

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Introduction

Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

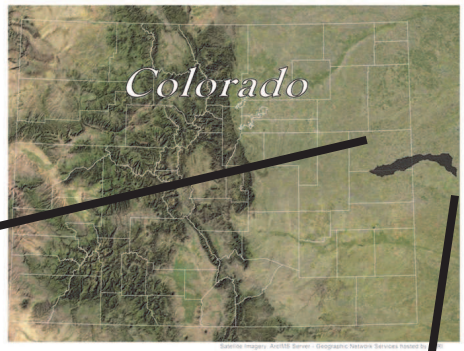
Benefits of these Activities

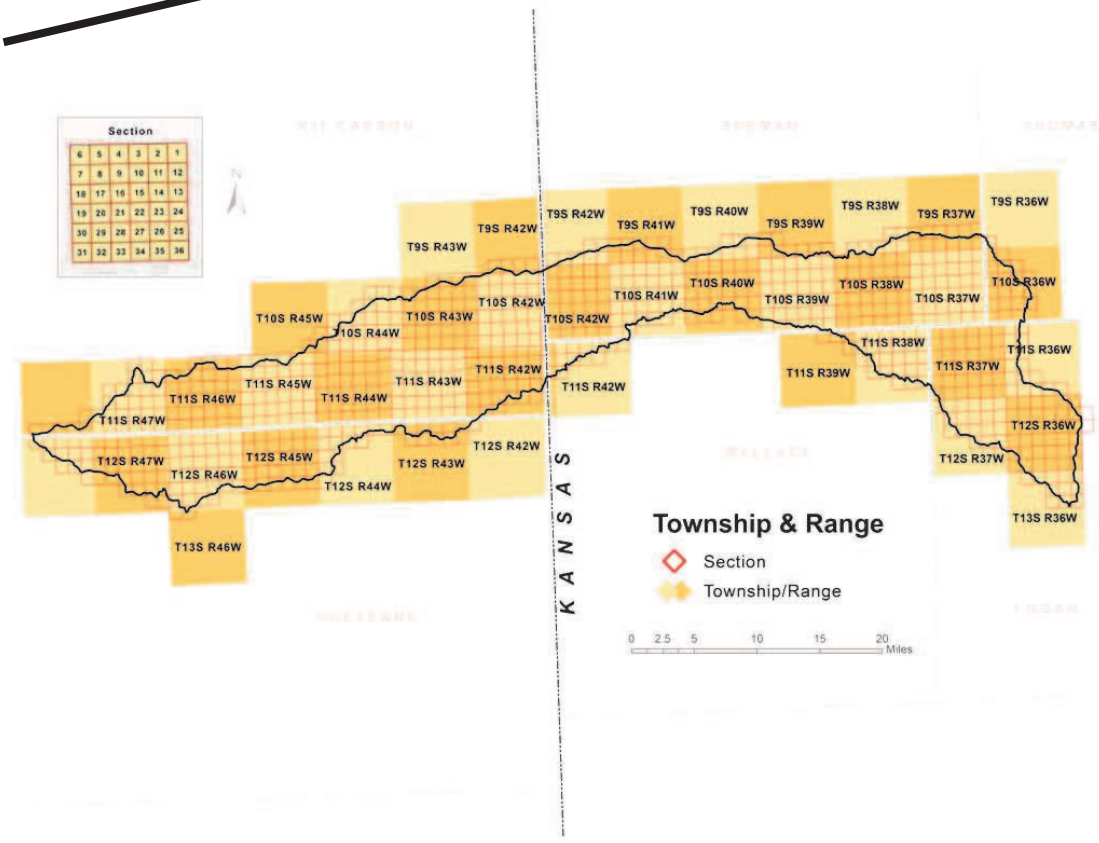
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis but these activities are part of standard requirements for use of best management practices (BMPs) and conservation systems
- Identifying where further detailed analyses or watershed studies are needed
- Plans address multiple objectives and concerns of landowners and communities
- Plans are based on established partnerships at the local and state levels
- Plans enable landowners and communities to decide on the best mix of NRCS programs that will meet their goals
- Plans include the full array of conservation program tools (i.e. cost-share practices, easements, technical assistance)

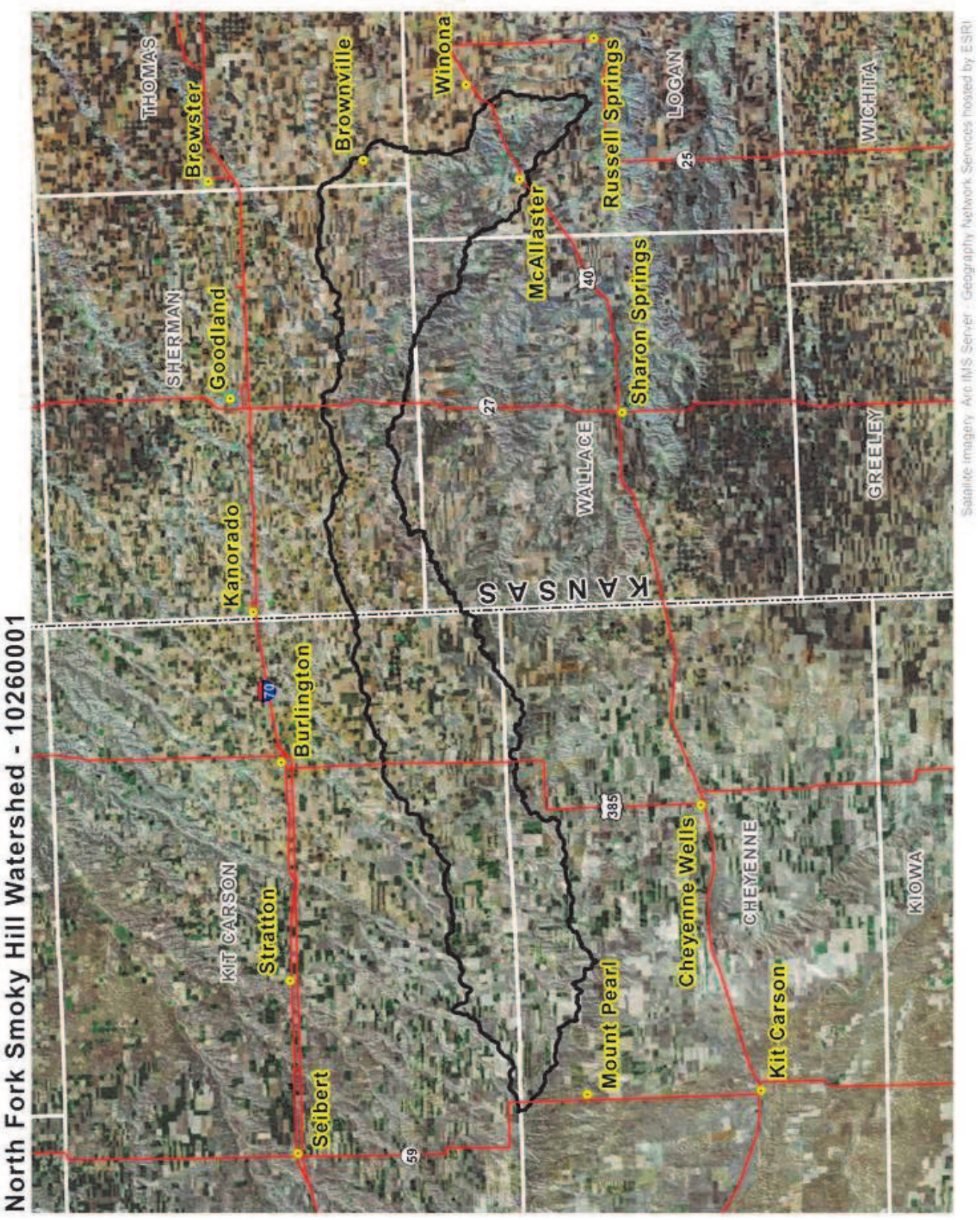
Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.

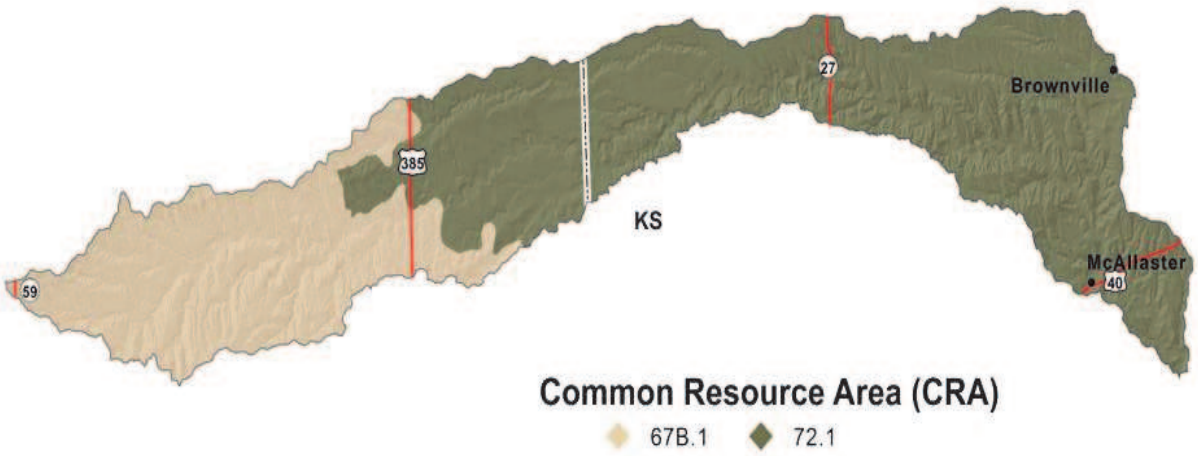
The North Fork Smoky Hill Watershed is located in the Republican River Basin, on the eastern plains of Colorado. The watershed is 467,813 acres in size, with 237,114 acres in Colorado. The watershed includes approximately 295 farms and ranches, and as of April 2005, there are 67,639 acres of land in the Conservation Reserve Program.





County	County Acres	County Acres in NORTH FORK SMOKEY HILL Watershed	% of County in the Watershed	% of Watershed in the County
Cheyenne	1,140,382	68,714	6.0%	14.7%
Kit Carson	1,383,742	168,817	12.2%	36.1%
KANSAS				
Logan	688,123	62,358	9.1%	13.3%
Sherman	676,627	138,810	20.5%	29.7%
Thomas	689,330	9,700	1.4%	2.1%
Wallace	585,647	19,413	3.3%	4.1%
		467,813		


North Fork Smoky Hill Watershed - 10260001
THOMAS
Brewster
Brownville
Winona
LOGAN
WICHITA
SHERMAN
Goodland
McAllaster
Russell Springs
Sharon Springs
Kanorado
WALLACE
GREELEY
KANSAS
Burlington
KIT CARSON
Stratton
Seibert
Mount Pearl
Cheyenne Wells
CHEYENNE
Kit Carson
KIOWA
70
27
40
25
385
59
Satellite Imagery: Arc IMS Server - Geography Network Services hosted by ESRI

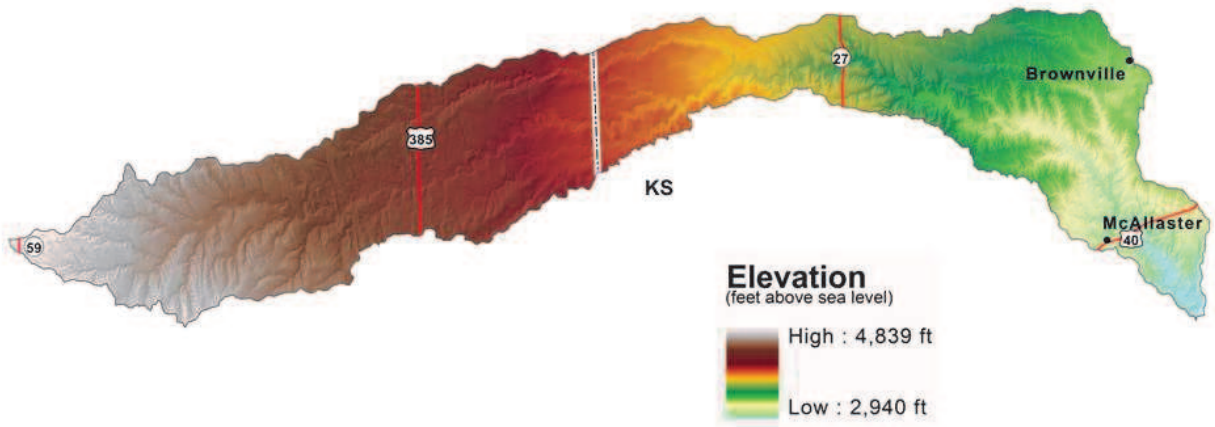


Common Resource Areas (CRA): Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

MLRA	CRA	CRA NAME	CRA DESCRIPTION
67B	**67B.1**	Central Great Plains, Southern Part	The Central High Plains, Southern Part CRA is broad, undulating to rolling plains dissected by streams and rivers. Local relief is measured in tens of feet on the plains. Soils are deep and formed in eolian and alluvial materials. Pre-settlement vegetation was short grass prairies. Nearly all of this area in fallow cropland rotations or rangeland. Some cropland areas are irrigated.
72	**72.1**	Central High Tableland	The Central High Tableland CRA is broad, level to gently rolling, loess mantled tableland. Local relief is measured in feet on the tableland tens of feet and major river valleys bordered by steep slopes. Soils are deep. Pre-settlement vegetation was short grass prairies. Nearly all of this area in cropland, both dry land small grain crops and irrigated corn and grain sorghum.

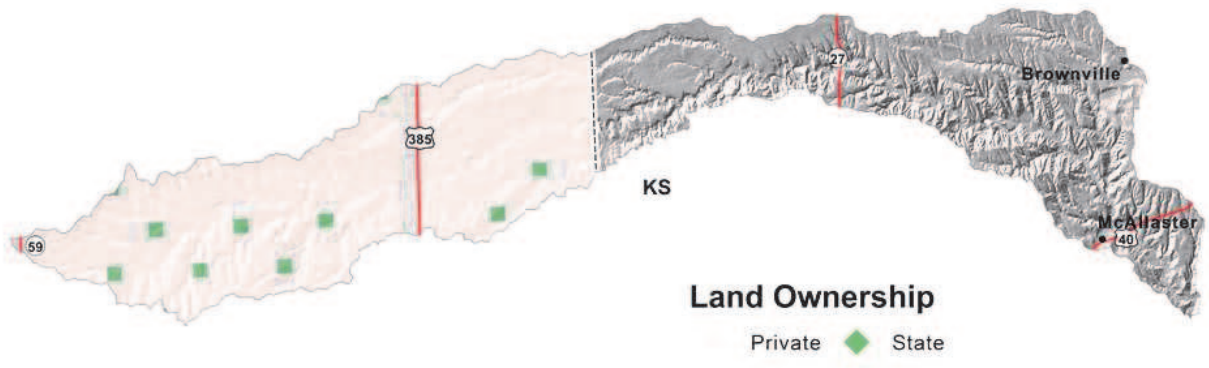
Physical Description

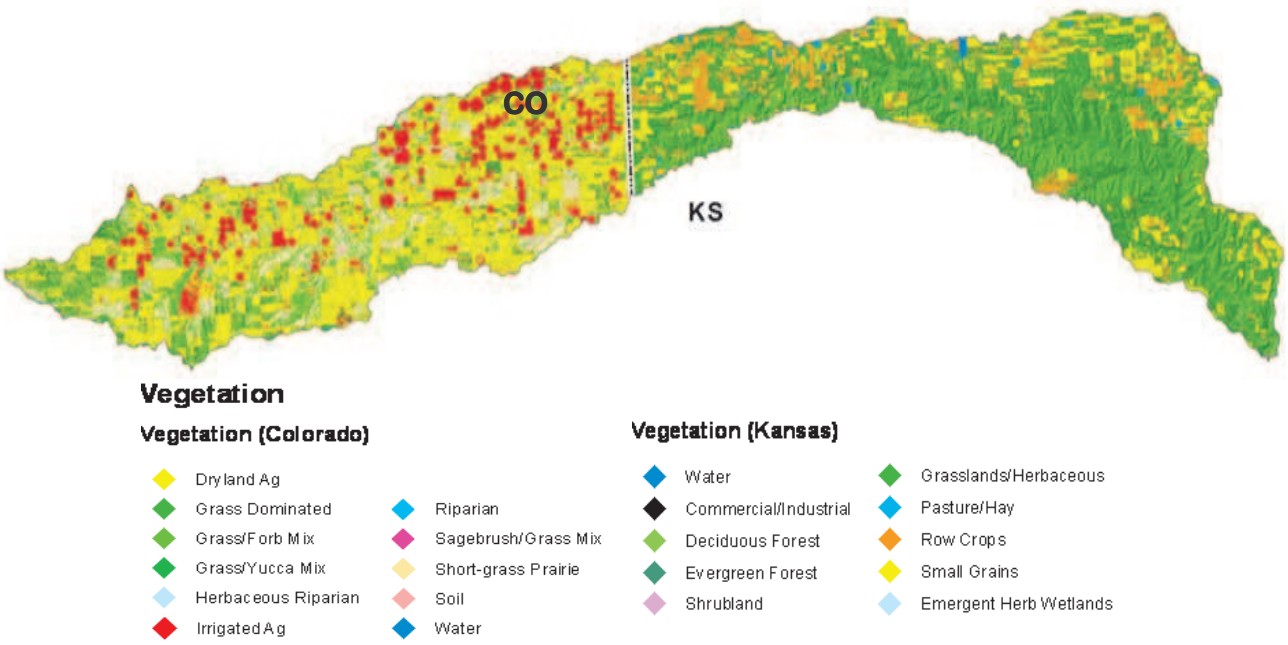
The North Fork Smoky Hill watershed consists of broad, inter-valley remnants of smooth plain, with gently rolling slopes, punctuated by steeper slopes along the drainages. The North Fork of the Smoky Hill divides deep, well-drained soils overlaying the Ogallala formation, and cuts into Cretaceous Pierre shale on the eastern edge of the watershed.



Land Ownership

Approximately 231,802 acres in the North Fork Smoky Hill Watershed are privately owned. There are 5,952 acres of state controlled land and 0 acres of federally controlled lands.



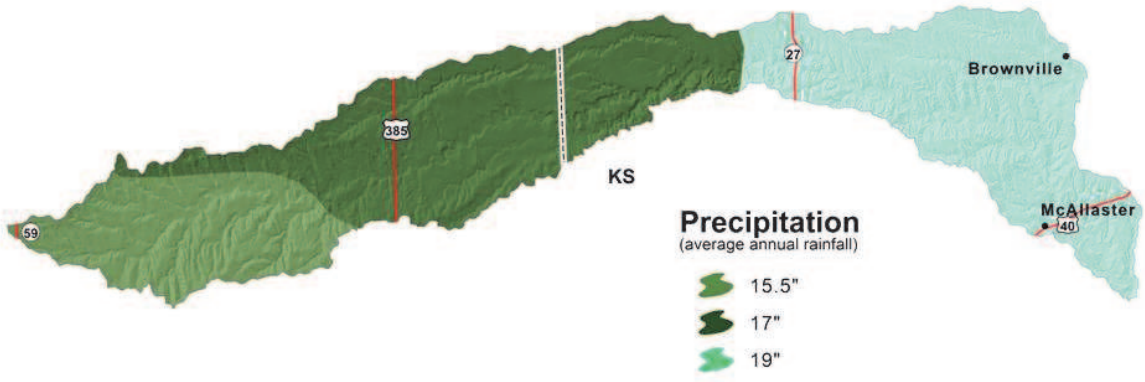


NORTH FORK SMOKY HILL Colorado Land Use	Total Acreage	Vegetation	Acreage
Cropland	149,768	Irrigated Ag	28,258.10
		Dryland Cropland	121,509.9
Rangeland/Grassland	85,288	Grass Dominated	38,069.80
		Grass Forbs Mix	10,912.06
		Grass/Yucca Mix	1.68
		Sagebrush/Grass Mix	43.71
		Short-grass Prairie	36,260.44
Riparian	2,614	Herbaceous Riparian	2,174.30
		Riparian	439.55
Water	1	Water	0.96
Other	19	Soil	18.55
Total Colorado Watershed Acres			**237,689**
NORTH FORK SMOKY HILL Kansas Land Use	**Total Acreage**	**Vegetation**	**Acreage**
Cropland	71,676	Pasture/Hay	4,334.05
		Row Crops	31.066.12
		Small Grains	36,276.17
Rangeland/Grassland	157,560	Shrubland	154.54
		Grasslands/Herbaceous	157,405.37
Forest	401	Deciduous Forest	373.81
		Evergreen Forest	27.49
Riparian	51	Emergent Herbaceous Wetlands	50.89
Water	562	Water	561.83
Other	12	Commercial/Industrial/Transportation	12.34
Total Kansas Watershed Acres			**230,263**

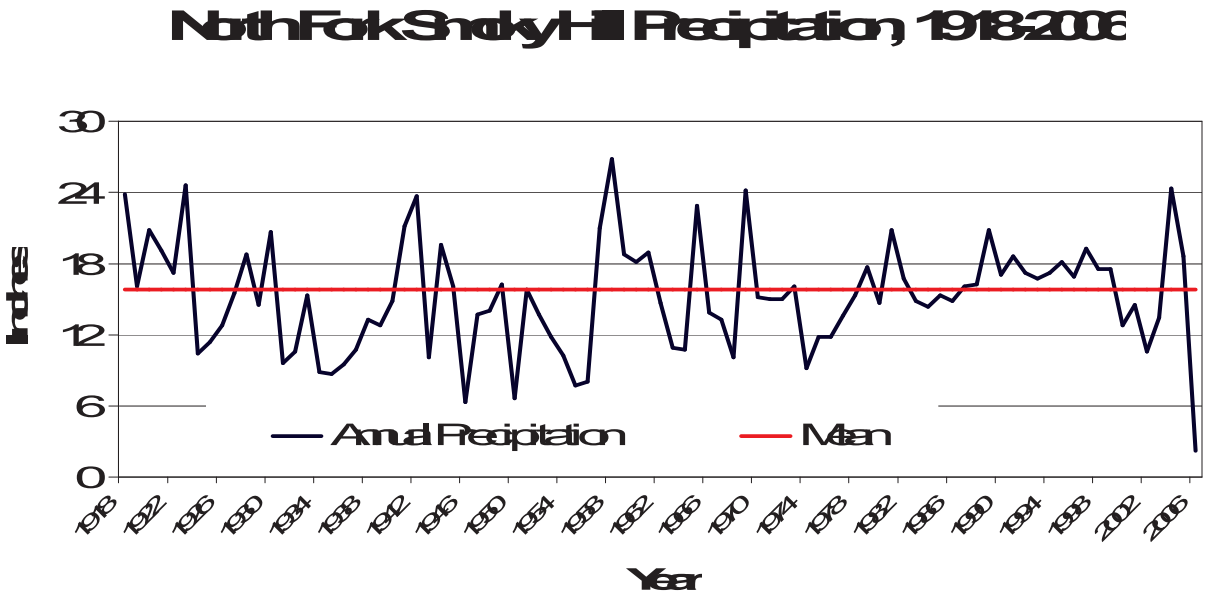
Precipitation

Precipitation in the North Fork Smoky Hill watershed averages between 15 and 17 inches per year. Droughts are common in the watershed, as with the rest of Colorado. Statewide, in the 1900's alone, four prolonged dry spells occurred. The first took place in the 1910s, and another, in the '30s, caused the dust-bowl period.

The second worst drought on record in the state occurred in the mid-50s, when a series of hot, dry summers following a period of scant mountain snowpack created water shortages. The fourth serious drought hit parts of Colorado in the late 1970s. In this century, the most severe drought since 1723 hit the state in 2002. Prior to the 1700's, researchers looking at tree ring records found evidence of droughts, even more severe than those during the record period, with some lasting many years.



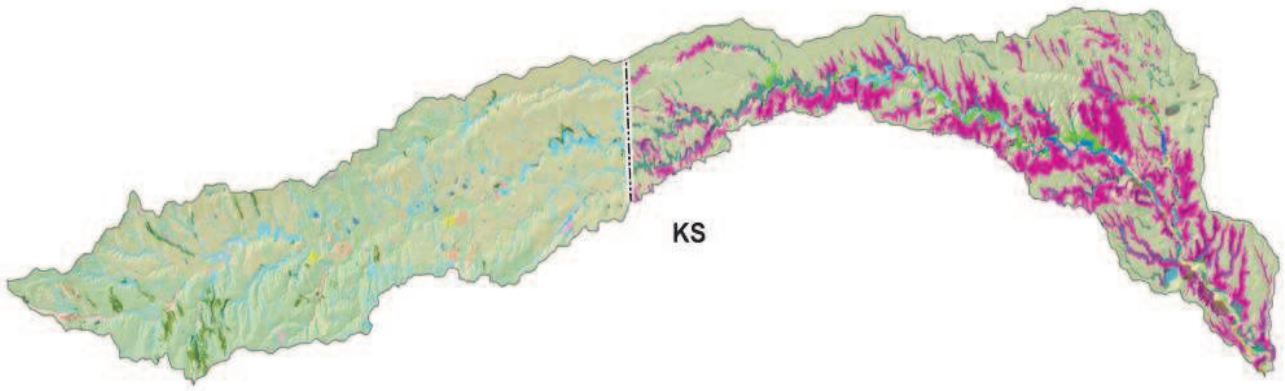
Rainfall in the watershed typically occurs as frontal storms in the spring and early summer, and as high intensity, convective thunderstorms in late summer. Maximum precipitation is from mid spring through late autumn, and precipitation in winter is snow. The average annual temperature is from 37 to 65 degrees F. The frost free period averages 155 days but ranges from 106 to 184 days.



Ecological Sites

The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

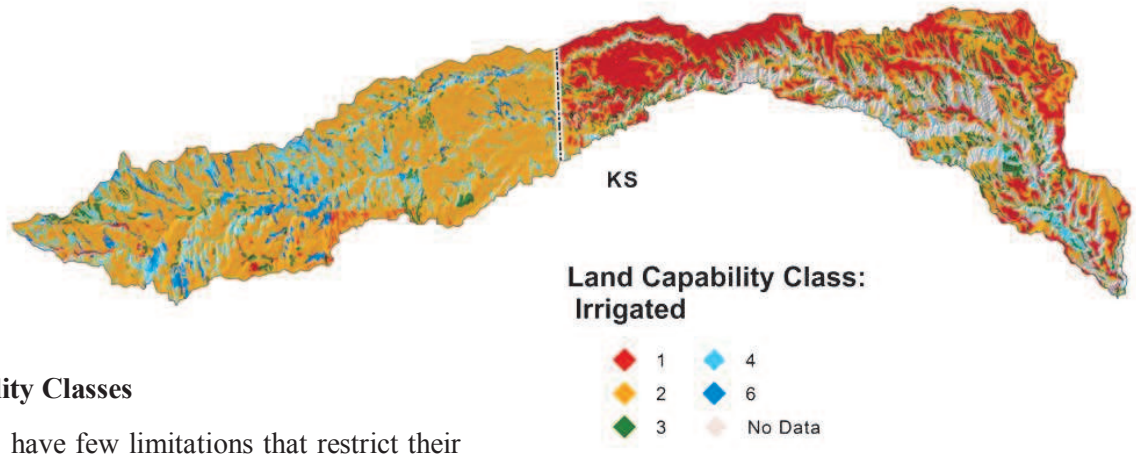
Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available in local offices of the Natural Resources Conservation Service (NRCS) and online at http://www.nrcs.usda.gov/technical/efotg/.



Soil: Ecological Site Name

- No Data
- CLAY UPLAND
- CLOSED UPLAND DEPRESSION
- Choppy Sands
- Clayey
- GRAVELLY HILLS (PE16-20)
- Gravel Breaks
- LOAMY LOWLAND (PE16-20)
- LOAMY TERRACE (PE16-20)
- LOAMY TERRACE (PE20-26)
- LOAMY UPLAND (PE16-20)
- Limestone Breaks
- Limy Upland
- Loamy
- Loamy Plains
- Loamy Slopes
- Loess Breaks
- Overflow
- Plains Swale
- SALINE SUBIRRIGATED (PE16-20)
- SANDS (PE16-20)
- SANDY (PE16-20)
- SANDY LOWLAND (PE16-20)
- SHALE BREAKS (PE16-20)
- SHALLOW LIMY (PE16-20)
- SUBIRRIGATED (PE16-20)
- Sandy
- Sandy Bottomland
- Sandy Plains

Land Capability Classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.



Land Capability Classes

Class 1 - soils have few limitations that restrict their use.

Class 2 - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

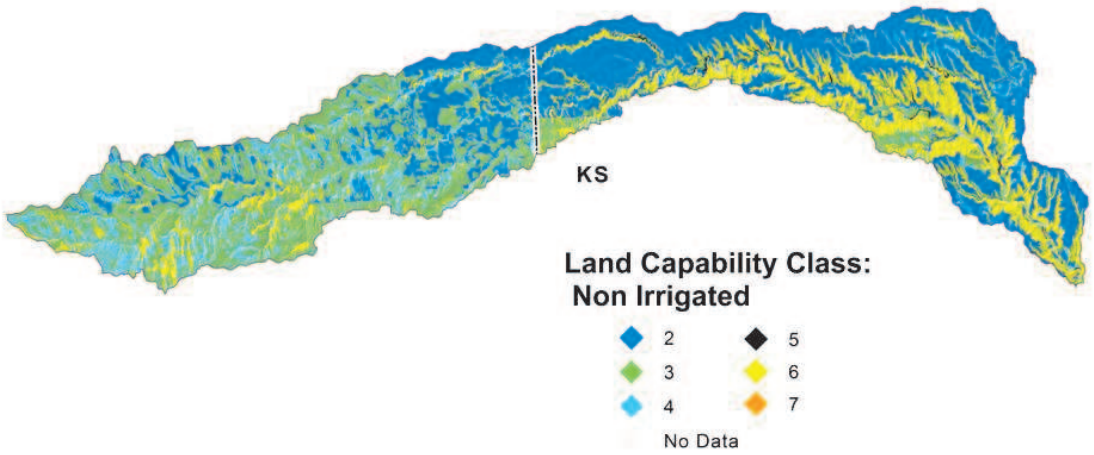
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

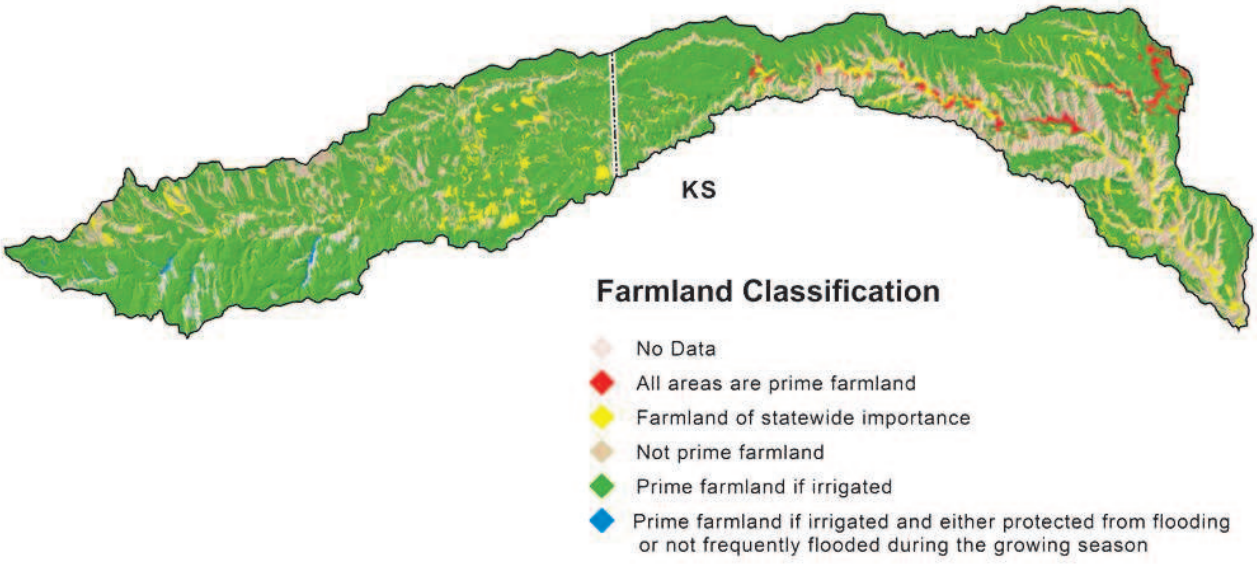
Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes

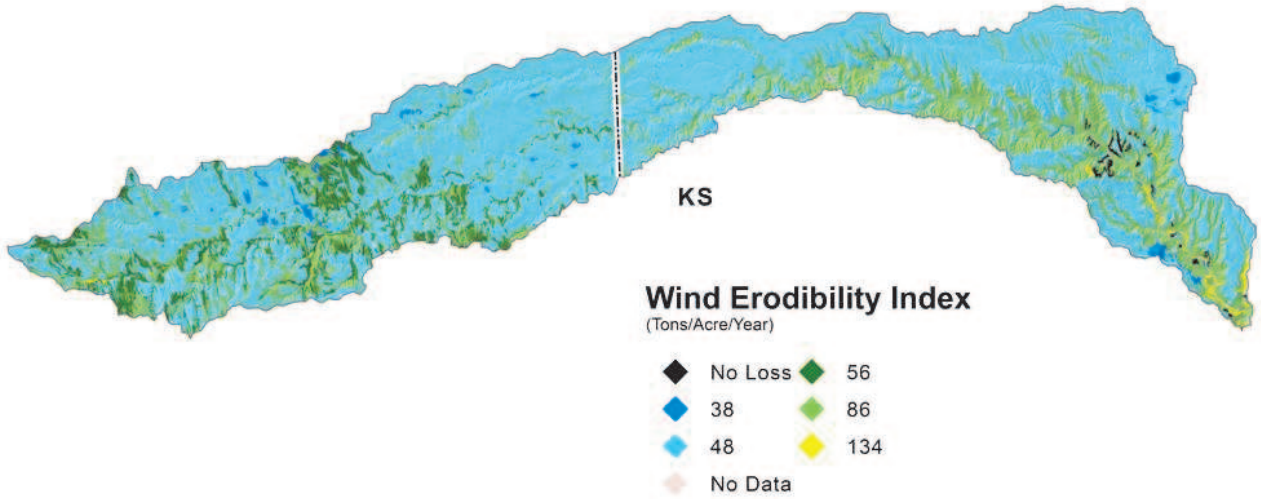


Farmland Classification

Prime farmland is land that has the best combination of physical characteristics for producing food, feed, forage, fiber and oil seed crops and is also available for these.

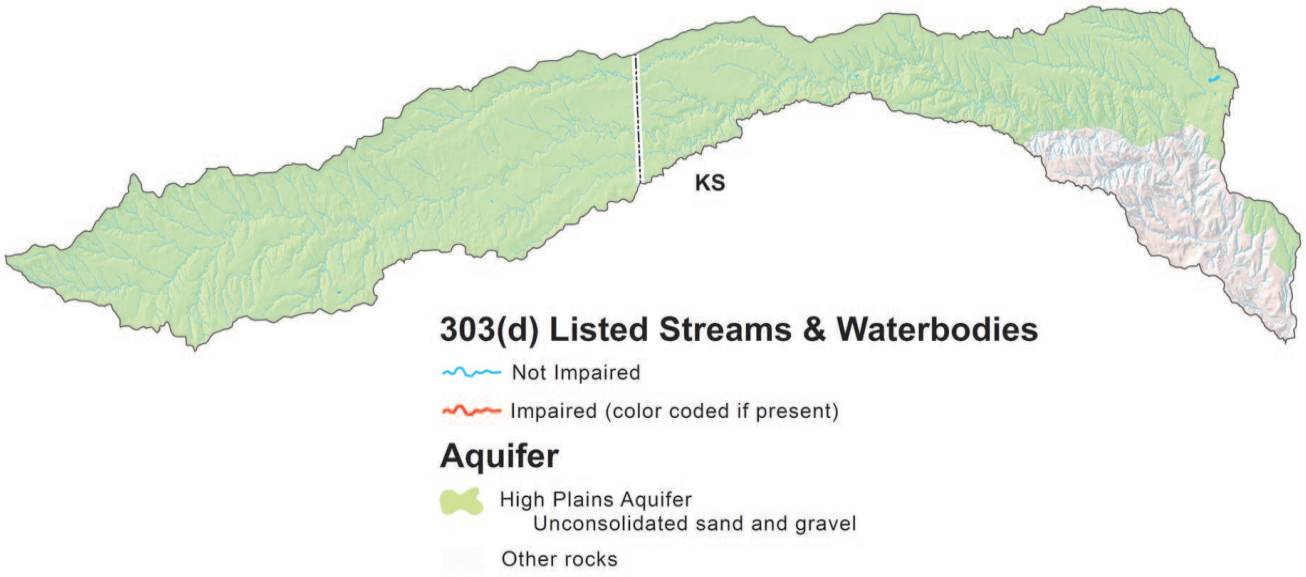


The Wind Erodibility Index (WEI): numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management. Soils with an erodibility index equal to or greater than 8 are considered highly erodible.



Surface Water Quality

Surface water quality in the North Fork Smoky Hill Watershed is generally good. Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met for designated uses. As indicated in the map, there are no 303(d) listed streams in the watershed. The river is designated as Primary Contact Recreation, Aquatic Life Warm I, and Agriculture.



Ground Water

The High Plains Aquifer underlies the North Fork Smoky Hill watershed, and is the primary source of irrigation and domestic water for the area. The High Plains aquifer is an extensive regional aquifer that underlies the Great Plains states extending from South Dakota on the north to Texas and New Mexico on the south.

Ground water quality is generally good, although moderately to very hard. Total dissolved solids in the aquifer have risen significantly since the early 1900s, and in some areas, the water may exceed drinking water standards for sulfate, chloride, fluoride, iron and arsenic. These concentrations may be naturally derived from geologic sources.

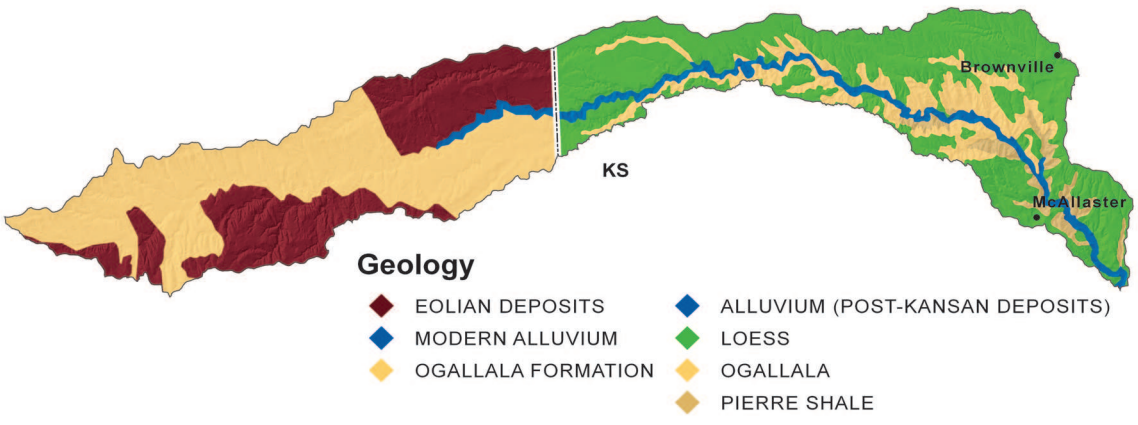
Hydrogeology

Era	System	Series	Stratigraphic Unit	Unit Thickness (feet)	Physical Characteristics	Hydrogeologic Unit	Hydrologic Characteristics
Cenozoic	Quaternary	Holocene and Pleistocene	Valley-fill deposits	0 to 60	Stream deposits of gravel, sand, silt, clay associated with the most recent cycle of erosion and deposition along present streams	High Plains aquifer	Shallow water-table aquifer(s). Well yields range from 500 to more than 1,000 gpm in several river valleys
			Dune sand	0 to 300	Fine to medium sand with small amounts of clay, silt, and coarse sand formed into hills and ridges by the wind		Typically lies above the water table; has a high infiltration rate and is important for ground-water recharge
			Loess	0 to 250	Silt with lesser amounts of very fine sand and clay deposited as windblown dust		Lies above the water table and does not yield water; serves for minor recharge
		Pleistocene	Unconsolidated alluvial deposits	0 to 550	Stream deposits of gravel, sand, silt, and clay locally cemented by calcium carbonate into caliche or mortar beds		Primary portion of the High Plains aquifer; mostly unconfined; yields range from 100 to 3,100 gpm; typically less than 300 gpm in Colorado; Ogallala is the most significant High Plains aquifer resource
	Tertiary	Miocene	Ogallala Formation	0 to 700	Poorly sorted clay, silt, sand, and gravel generally unconsolidated; forms caliche layers or mortar beds when cemented by calcium carbonate; Ogallala makes up large part of High Plains aquifer		
			Arikaree Group	0 to 1,000	Predominantly massive, very-fine to fine-grained sandstone with localized beds of volcanic ash, silty sand, siltstone, claystone, sandy clay, limestone, marl, and mortar beds; part of the High Plains aquifer		Can be confined; moderately permeable. May yield up to 200 gpm in localized areas
		Oligocene	White River Group	0 to 700	Upper unit, Brule Formation, is considered part of the High Plains aquifer in Colorado, predominantly massive sandstone containing sandstone beds and channel deposits		Typically confined, except at outcrop; yields typically less than 100 gpm
					Lower unit, Chadron Formation, mainly consists of varicolored, bentonitic, loosely to moderately cemented clay and silt		Chadron is mostly impermeable

From Gutentag and others, 1984

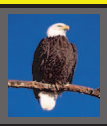
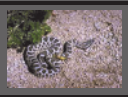
Geology

The North Fork Smoky Hill River lies within the Ogallala formation, and dips into Cretaceous Pierre shale on the eastern edge of the watershed. Eolian sands and silt cover much of the uplands surrounding the river.



Threatened & Endangered Species

State & Federally Threatened, Endangered & Candidate Species as well as Species of Special Concern in N. Fork Smoky Hill Watershed

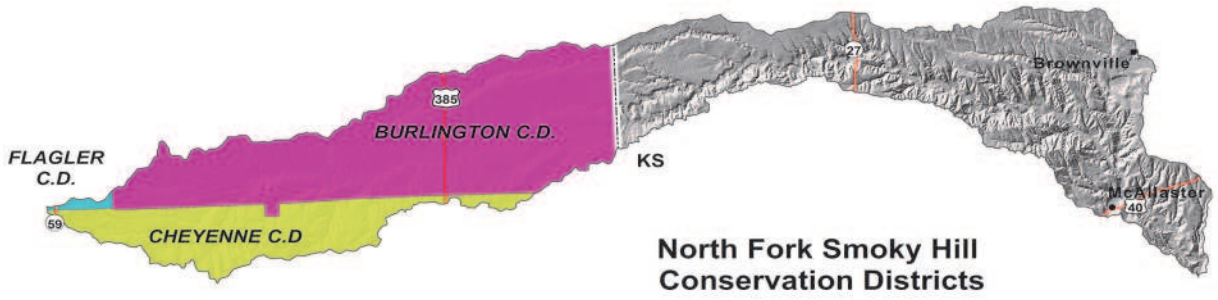
	Common Name	Scientific Name	Class	Federal Status	State Status	Comments
	**Bald Eagle**	*Haliaeetus leucocephalus*	Birds	None	Threatened	May migrate through watershed
	**Black-footed Ferret**	*Mustela nigripes*	Mammals	Endangered	Endangered	No current records of occurrence
	**Black-tailed Prairie Dog**	*Cynomys ludovicianus*	Mammals	None	Concern	Occurs in the watershed
	**Brassy Minnow**	*Hybognathus hankinsoni*	Fish	None	Threatened	May occur in the watershed
	**Burrowing Owl**	*Athene cunicularia*	Birds	None	Threatened	Occurs in the watershed
	**Cylindrical papershell**	*Anodontoides ferussacianus*	Gastropods	None	Concern	May occur in the watershed
	**Ferruginous Hawk**	*Buteo regalis*	Birds	None	Concern	Occurs in the watershed
	**Long-Billed Curlew**	*Numenius americanus*	Birds	None	Concern	May occur in the watershed
	**Massasauga**	*Sistrurus catenatus*	Reptiles	None	Concern	May occur in the watershed
	**Mountain Plover**	*Charadrius montanus*	Birds	None	Concern	Occurs in the watershed
	**Northern leopard frog**	*Rana pipiens*	Amphibians	None	Concern	May occur in the watershed
	**Plains Leopard Frog**	*Rana blairi*	Amphibians	None	Concern	May occur in the watershed
	**Plains Orangethroat Darter**	*Etheostoma spectabile*	Fish	None	Concern	May occur in the watershed
	**Swift fox**	*Vulpes velox*	Mammals	None	Concern	Occurs in the watershed
	**Yellow mud turtle**	*Kinosternon flavescens*	Reptiles	None	Concern	May occur in the watershed

Shortgrass prairie is the dominant, non-cropland, terrestrial habitat type in this watershed. The Conservation Reserve Program also provides a significant acreage of grassland habitat in this watershed. Burrowing owl, mountain plover, black-tailed prairie dog, and swift fox are representative species for the shortgrass habitat. Water is scarce and the native species in this watershed are those that can survive without abundant water supplies. Riparian areas, playa lakes, and stock ponds provide seasonal to intermittent aquatic habitats. Economically important wildlife species that occur in the watershed include pronghorn (antelope), mule and/or white-tailed deer, mourning dove, and pheasant.

Social Data

County	Cheyenne	Kit Carson	Logan
Demographics (US Census, American Factfinder)			
Total population	2,231	8,011	
Male	1,119	4,236	
Female	1,112	3,775	
Median age (years)	37.9	37.4	
White	2,072	6,992	
Black or African American	11	139	
American Indian and Alaska Native	17	41	
Asian	3	26	
Native Hawaiian and Other Pacific Islander	0	3	
Some other race	114	737	
Hispanic or Latino (of any race)	181	1095	
Economic Characteristics (US Census, American Factfinder)			
In labor force (population 16 years and over)	1,066	3,746	
Median household income (dollars)	37,054	33,152	
Median family income (dollars)	44,394	41,867	
Per capita income (dollars)	17,850	16,964	
Families below poverty level	53	198	
Individuals below poverty level	244	908	
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)			
Farms (number)	283	678	930
Land in farms/ranches (acres)	740,486	1,247,181	1,111,135
Average size farm/ranch (acres)	2,617	1,840	1,195
Median size farm (acres)	1,528	11,112	608
Average age of farmer or rancher	57.2	54.3	52.8
Net cash return from ag sales ($1,000)	1,829	3,392	5,092
Cattle and calves (number)	20,000	148,000	185,000

Conservation District Priorities



Resource Concerns Identified by Conservation Districts

Resource Concern By Priority	Burlington	Cheyenne	Flagler	Total
Rangeland/Grazingland Health and Productivity	3	6	5	14
Soil Erosion	5		6	11
Water Quality/Quantity	6	4		10
Tree Planting	4	3		7
Sustainable Cropland		5		5
Invasive Species		2		2
Conservation Education	2			2
Trees	4	3		7
Conservation Policy	1			1

Notes:

The Conservation Districts identified and prioritized these resource concerns during facilitated public meetings held between 1998 and 2000 and are part of the Conservation District's Long Range Plans. Higher scores indicate higher priority

Selected Conservation Application Data

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	6,305	1,770	Not Avail.	7,662	13,165	4164	33,066
Total Conservation Systems Applied (Acres)	5,397	19,840	Not Avail.	14,011	17,144	5,716	62,108
Practices							
Prescribed Grazing	0	2,594	0	24,697	1,974	1,758	31,023
Upland Wildlife Habitat Management	620	1,107	35	162	0	0	1,924
Conservation Cropping System	0	0	0	959	0	119	1,078
Residue Management	1,469	4,520	1,601	1,107	4,267	241	13,205

Conservation Systems to Address Major Resource Concerns

Primary Resource Concern:	**Rangeland Health**			
Conservation System Description:	Prescribed Grazing—Planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals. Estimate 32,500 acres need to be treated on median sized ranches of 3,000 acres.			**Based on Conservation System Guide Code:** CO 67B.1-GR-01-R-Grazing
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost per Median Sized Ranch ($)**
Prescribed Grazing				
Fencing (382)	Ft.	5,000	.60	3,000
Pipeline (516)	Ft.	3,000	2.40	7,200
Upland Wildlife Habitat Management (645)	Ac.	300	na	0
Watering Facility (614)	No.	4	410	1,640
Costs to apply prescribed grazing per median sized ranch of 3,500 acres	No.	11	11,840	
			Subtotal Rangeland costs:	**$130,240**

Conservation Systems to Address Major Resource Concerns (continued)

Primary Resource Concern:	Water Quality			
Conservation System Description:	Upgrading Sprinkler irrigation system with IWM, Crop rotation, Nutrient and Pest Management			**Reference Conservation System Guide Code:** CO 72.1-CR-Sprinkler-R-2
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Irrigation Water Management (449)* * includes re-bowl, renozzle, and IWM	Ac	24,000	10.20	244,800
Nutrient Management (590)	Ac	30,000	5	150,000
Pest Management (595)	Ac	30,000	15	450,000
Subtotal Irrigation Costs				**$844,800**

Resource Concern:	Soil Erosion By Wind			
Conservation System Description:	Seasonal residue management with Conservation crop rotation, Nutrient and Pest Mgt. Estimate 48,000 acres needed to be treated.			**Reference Conservation System Guide Code:** CO 67B.1-CR-Dryland-R-1
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Conservation Crop Rotation (328)	Ac	48,000	5	240,000
Residue Mgmt, Mulch Till (345)	Ac	45,000	5	225,000
Nutrient Management (590)	Ac	20,000	5	100,000
Pest Management (595)	Ac	15,000	15	225,000
Subtotal cropland costs				**$790,000**

General Effects, Impacts, and Estimated Costs of Application of Conservation Systems

Landuse	Resource Concern	Measurable Effects	Non-measurable Effects	Estimated Cost ($)
Rangeland	Plants		Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter. Wildlife habitat is sustained or improved.	**130,240**
Dryland Crop	Soil	202,500 Total Tons/Year saved	Cropland sustainability	**790,000**
Irrigated Crop	Water		Nutrients and organics are stored, handled, disposed of, and managed so that surface water uses are not adversely affected.	**844,800**
			Estimated Total Costs to Address Major Resource Concerns:	**$1,765,040**

References Not Cited in Document

303(d) listed streams within Big Sandy Watershed were created using data from Colorado Department of Public Health & Environments' Water Quality & Control Commission. Impaired streams are current as of April 30, 2006. For a list of all Colorado impaired streams, locations and priority ratings, visit http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf.

Threatened and Endangered Species information was gathered using data from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS).

Resource Concerns were identified using the Colorado Association of Conservation Districts' (CACD) long range (10 year) plans from the period of 1996-2000. For more information on Colorado's Conservation Districts, visit http://www.cacd.us.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado and Kansas surveys:

Cheyenne County Area (CO017) Published 12/19/2005

Kit Carson County Area (CO063) Published 12/20/2006

Logan County Area (KS109) Published 12/20/2006

Sherman County Area (KS181) Published 12/22/2006

Thomas County Area (KS193) Published 12/23/2006

Wallace County Area (KS199) Published 12/28/2006

Vegetation data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. visit http://ndis.nrel.colostate.edu/coveg.

Common Resource Area (CRA), a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. For more information on Common Resource Areas visit http://soils.usda.gov/survey/geography/cra.html.

Average Annual Precipitation data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990. For more information visit http://www.ncgc.nrcs.usda.gov/products/datasets/climate/docs/fact-sheet.html or http://www.ocs.orst.edu/prism.

Land Ownership (status, 2004 dataset) data was obtained from the Colorado Department of Transportation (CDOT). For more information, visit http://www.dot.state.co.us.

Relief & Elevation maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS). The data was downloaded from the NRCS Geospatial Data Gateway at http://datagateway.nrcs.usda.gov.

Conservation Systems to address major resource concerns were extracted from the Conservation Systems Guides (CSG) compiled from local conservationists by the NRCS Ecological Sciences Section at the Lakewood State Office.

Effects and Impacts of application of conservation systems were extracted from Colorado eFOTG, Section III, Resource Quality Criteria, NRCS, Colorado, March 2005.